# Mobilizing the utility workforce

*How mobile technology and analytics will transform work*

IBM Institute for Business Value

## How IBM can help

New energy technologies and the changing economics of energy are altering the energy mix for utilities, increasing environmental and regulatory interventions, creating investment uncertainties and extending commercialization across the industry. IBM helps energy and utilities clients develop smarter energy capabilities to improve reliability, efficiency and return on assets, reduce costs, improve safety and transform operations for the 21st century. For more information about IBM energy and utilities offerings, visit **ibm.com**/industries/energy/

## *Sparking a mobile transformation*

*Mobile technologies have become imperative for utilities. In conjunction with analytics, mobile technologies help promote operational efficiency, increased productivity, enhanced safety and expanded service delivery alternatives. To fully realize these benefits, utilities will need to embrace the technology. By redesigning work processes and activities from a "mobile first" perspective, the industry will be positioned to aggressively innovate and evolve with rapidly changing energy markets.*

# Executive summary

Powerful forces are challenging energy and utility companies across the globe. New energy technologies and the changing economics of energy are altering the energy mix, increasing environmental and regulatory interventions, creating investment uncertainties and extending commercialization across the industry. In addition, customers are assuming a more prominent role in a growing number of markets.

In the face of these challenges, innovation has never been more important for the industry. And yet, many utility workers continue to rely on paper-based transactions. In the field, workers remain tethered to their trucks, with limited mobile functionality. As a consequence, their productivity lags behind that of workers with access to applications designed from a "mobile first" perspective.

By embracing mobile technology and analytics, utilities can position themselves to accelerate innovation, facilitate new services across an expanding range of energy alternatives and adapt to dramatically changing energy markets. But succeeding with enterprise mobility is as much a people challenge as it is a technology challenge. To transition effectively, the industry must develop and deploy these technologies while remaining focused on productivity, use cases and the user experience. Workers will more readily adopt an effectively designed app that has the end user in mind, and as a result, utilities can reduce training costs and uptake frictions.

**Most** of a utility's assets and **most** of its workforce are **distributed across vast territories**

Utilities that **embrace innovation** outpace the industry in **overall value creation**

**84 percent** of CIOs rate mobile solutions as a critical area for their businesses

# Industry challenges

Most utilities, including electricity, gas and water providers, face a variety of significant challenges today. New energy technologies, growing customer involvement and cost and performance pressures are just a few of the obstacles utilities must contend with if they want to continue to succeed.

Rapid advancements in wind and solar generation, battery storage, and microgrid and smart grid technologies are creating a new, more complex and interconnected energy infrastructure. The International Energy Agency forecasts that by 2030, renewable energy generation will grow to become the world's biggest source of electricity – more than doubling capacity in 15 years.[1] Even now, Germany, an early adopter, gets about 30 percent of its power from wind and solar generation, and that figure climbs to as high as 80 percent on record days.[2]

Customers are playing a more direct role in energy production and management. Increasingly, businesses and consumers around the world are using rooftop solar to generate electricity. Smart thermostats and appliances can automatically manage demand in real time, optimizing energy consumption.

Employee recruitment and retention is a challenge. Utility field work continues to be a dangerous occupation. Death and injury rates among utility workers have remained relatively high, despite increased emphasis on safety policies and procedures.[3] And for an industry that isn't regarded as particularly innovative or likely to advance younger workers, attracting technically and digitally savvy talent can be difficult – especially in areas where the workforce is aging rapidly.

Like most other companies, utilities continue to face significant pressure to reduce operating costs and optimize capital investments while retaining service levels and opening new business areas. These pressures persist across all regulatory frameworks.

In the face of these challenges, innovation has never been more important for the industry. IBM Institute for Business Value analysis indicates that utilities that embrace innovation outpace the industry in overall value creation.[4] Over a three-year period, innovative utilities realized a 37 percent compound annual growth rate (CAGR), whereas the S&P 500 utilities index showed a more modest growth of 9 percent for the same period.[5]

Mobile technology is an essential component of innovation for energy and utility companies. Utilities are inherently mobile; most of a utility company's assets and most of its workforce are distributed across vast territories. Mobile technology combined with analytics can help utilities rapidly accelerate innovation, operational efficiency, product and service improvement, and business development.

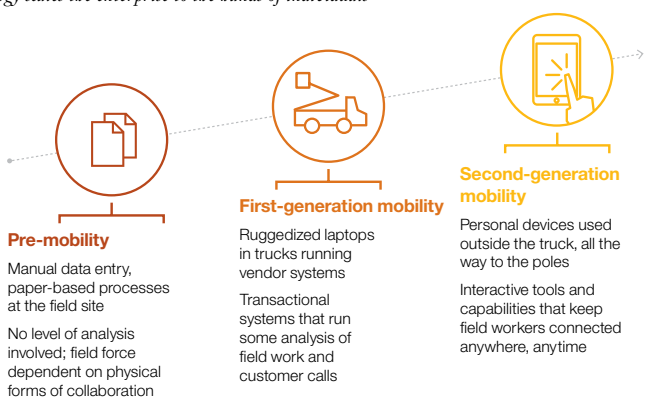
# Transformation through mobile technology and analytics

Contextual mobility powered by analytics is a key business priority across industries. Globally, 84 percent of chief information officers (CIOs) rate mobile solutions as a critical area for their business,[6] and 94 percent of chief marketing officers (CMOs) rank mobile technology as critical to digital marketing.[7] Globally, utilities are expected to invest more than USD 20 billion in analytics between 2012 and 2020, with anticipated returns of more than USD 120 billion.[8]

Growth in spending reflects a step change in what mobile technology means to the utility industry. Utilities are shifting from portable versions of legacy systems to second generation mobility (see Figure 1). First-generation mobility typically involved outfitting trucks with ruggedized laptops to dispatch field work and record work-order completion, which helped technicians complete basic transactions inside the truck.

**Figure 1**

*Mobile technology scales the enterprise to the hands of individuals*



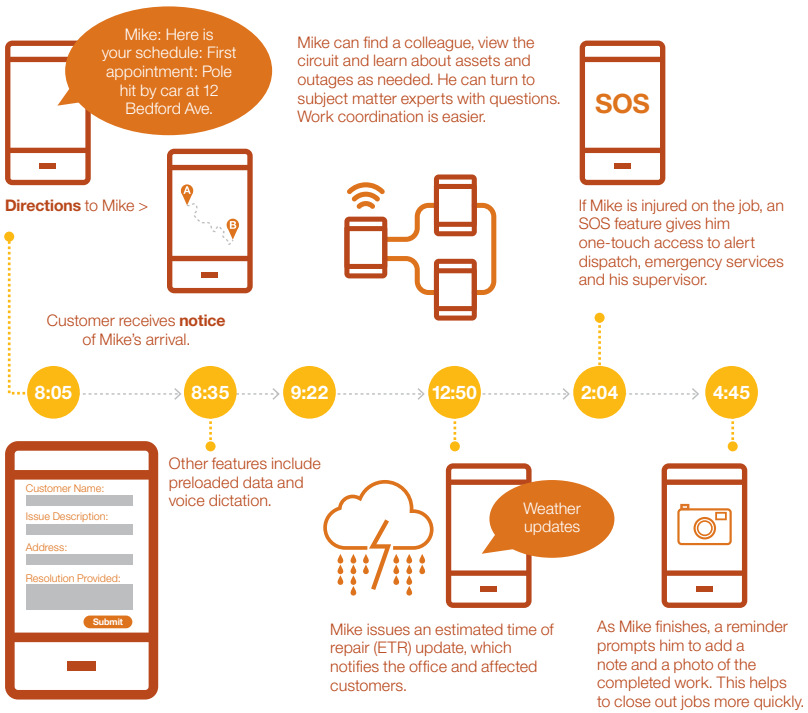

*Source: IBM Institute for Business Value analysis.*

Second-generation mobility dramatically changes the way work is done in the field. New mobile workforce technology is built around personal smartphones, tablets and wearable technologies using geolocation, orientation, near-field communications (NFC), voice interaction, picture, video and fingerprint identification capabilities. This technology can leverage specialized connected devices, such as thermal cameras and RFID readers, and interact across multiple systems to support functions such as scheduling and dispatch, outage reporting, billing, mapping, and asset-management. The technology can also support external traffic, weather and social media platforms.

With mobile devices becoming ever cheaper and mobile capabilities growing ever greater, utilities can now put the technology into the hands of more employees and contractors than ever before. Underpinned by sophisticated analytics, the extended application of mobile technology throughout the utility industry can help employees make decisions and perform tasks in highly coordinated and collaborative ways,  regardless of location (see Figure 2).

**Figure 2**

*An example of a mobile-enhanced field worker's day*




*Source: IBM Institute for Business Value analysis.*

# Adding value

Mobile technology and analytics can create value for utilities across four key dimensions: operating efficiency, workforce effectiveness, worker safety and service delivery.

**Operating efficiency**

Mobile technology increases worker productivity, improving operational efficiency across a utility's operations.

*Increasing back-office productivity*

Using mobile technology, workers can enter data much more rapidly – and with fewer keystrokes – and they can sign off on documents electronically. These capabilities reduce back-office production times and improve margins, and also eliminate paperwork and reduce the need for supervisory review. Mobile technology can also provide near real-time visibility into information to support better decision making and decrease the time it takes to improve results.

*Driving data quality*

Mobile technology can improve data quality. Utilities can use the technology to capture time, location and user information automatically – and much more accurately and granularly – than with data entry. Workers can use mobile capabilities to quickly supplement data entries with pictures, video, barcode or RFID information, and voice recording – all without having to fumble with a keyboard. Mobile technology can also improve data quality through GPS-enabled map redlining and real-time asset inventorying in the field (see sidebar, "Major U.S. power generator deploys mobile for improved process efficiency").

### Major U.S. power generator deploys mobile for improved process efficiency

To keep maintenance and operations running efficiently, a major U.S. power generation company adopted a mobile strategy to pursue new opportunities for increasing field worker productivity. The company provided users with mobile devices that incorporated a simple, intuitive user interface (UI). The devices delivered fast performance and a straightforward, robust architecture, resulting in improved work management processes. Leveraging its mobile solution, the organization was able to conduct work management tasks in the field, including creating work requests, viewing and updating assigned work orders, capturing labor hours, adding failure reporting, issuing parts, and capturing photos as attached documents.

**Workforce effectiveness**

Mobile technology and analytics can free specialists to focus on high-value tasks, improving workforce effectiveness through increased collaboration, better performance management, and reduced reporting and documentation tasks.

*Increasing collaboration*

Effective teamwork in the field is often challenging. For companies that have remote crews traveling among geographically disparate offices, the benefits of implementing a mobile solution can be substantial. Mobile collaboration tools can improve coordination and help companies reprioritize work on the fly. Interactions with control rooms, for example, can become more automated and reliable than voice-only communications. Proximate work crews can readily collaborate to quickly resolve or diffuse difficult or dangerous work situations. Specialists with expertise in particular equipment or situations can remotely guide fieldworkers through unfamiliar tasks. And workers across natural gas, water, electricity, roadwork and emergency services can potentially share safety information and status updates.

*Embracing performance management*

Mobile solutions can help utilities more readily identify, manage and resolve root causes of business problems. For example, utilities can use mobile technology to automate the collection of crew statistics, such as onsite crew performance, and arrival and departure times. Additionally, the technology can help utilities create views to drill down through various performance levels and groups, including territory, product, technician and customer data. And mobile technologies can be further enhanced to create a business culture in which employees receive the continuous feedback they need to become and remain high performing.

*Improving reporting and documentation*

Unlike legacy mobile solutions, which typically required employees to complete jobs in the truck, second generation mobility eliminates vehicle dependency. Utility workers can now conduct inspection reports while physically surveying jobsites and documenting findings on location. Mobile solutions can leverage GPS and automated time recording to optimize jobsite reporting, location data and before-and-after pictures or video to more effectively validate consumer claims for jobsite-related damage (see sidebar, "Leading European utility reduces error rates and saves time with mobility").

**Worker safety**

Mobile technology has the potential to dramatically improve the safety of utility workers in the field, at the depot and in the office.

*Tailoring training and briefings*

Utilities can use mobile technology to optimize refresher training by providing supplemental reviews of equipment or skills  Companies can tailor training for specific tasks or assets. Workers can use the technology to conduct morning safety (or "tailboard") meetings on site in a contextual way, improving relevance and specificity.

*Providing meaningful, timely notifications*

Crews operating in poor weather can receive real-time updates about conditions and safety mandates. Real-time analytics can monitor changing conditions and provide alerts. Companies can use mobile technology to tailor notifications to a crew's precise geography, workers' individual certifications and training, and specific tasks assigned. And mobile solutions based on wearable technologies can even give insight into the specific health status of individual workers.

### Leading European utility reduces error rates and saves time with mobility

A European electric utility has deployed high-tech mobile equipment for field workers to increase productivity. Integrating multiple SAP components with attendance and GPS vehicle tracking systems, the new mobile solution provides interfaces to SAP and pushes destination information directly to drivers, who no longer need to enter destination addresses. The system optimizes routes, directing drivers in the most direct way from job to job. The mobile solution has saved time and resources, reduced error rates and improved efficiency and response times, yielding field productivity improvements of nearly 20 percent.

### CenterPoint Energy uses innovative app to connect with customers[9]

CenterPoint Energy is a large electric and natural gas utility serving several markets in the United States. CenterPoint Energy uses a mobile technology-based solution to support its Power Alert Service, which maintains contact with registered consumers during electric power outages. The solution is able to provide alerts via text, email or phone, depending on registered consumers' preferences. The supporting analytics provide estimated resolution times, confirm underlying causes and identify solutions.

*Increasing awareness*

For workers in the field, an awareness of nearby crews can be potentially lifesaving. When trouble arises for a crew, being able to call on nearby resources for quick assistance, equipment or technical knowledge can be invaluable. Mobile technology can also help coworkers stay informed about nearby traffic and any police, fire or emergency services activities that could impact their work.

**Service delivery**

Mobile technology can enable new services and support new business models across the industry.

*New approaches*

Mobile technology combined with analytics can reveal new insights that can transform existing services. For example, during a network outage, a utility can use information employees or customers capture in the field to improve early assessments and dispatch the best-suited crew, skills and equipment the first time. The technology can also help companies deliver notifications of crew arrival times and up-to-date completion estimates to affected customers (see sidebar, "CenterPoint Energy uses innovative app to connect with customers"). And by enabling work assignments to be broken into smaller discrete tasks, it can support more decentralized labor marketplaces.

*New businesses*

For utilities, the advancement of energy technologies and the move to more distributed energy sources presents challenges, but also many new possibilities. From new distributed consumer and community energy systems to the leasing of consumer rooftops, utilities will need to adapt to a distributed energy environment. New competitors are emerging, and these organizations are taking greater advantage of mobile technology to deepen customer insight and offer new services. Traditional utilities businesses will come under continued pressure to deliver and perform.

# Implementing mobile and analytics in utilities

A phased mobile and analytics implementation will help utilities realize business benefits (see Figure 3).

**Figure 3**

*Five steps to a mobile and analytics transformation for utilities*


*Source: IBM Institute for Business Value analysis.*

**Step 1: Understand the capabilities and expectations**
Start by thoroughly investigating mobile technology's capability to improve safety, reduce truck rollouts, increase coordination, speed repairs, reduce overtime and improve outage metrics. Review and update business processes, especially those surrounding utility fieldwork, to most effectively apply analytics and mobile technologies. When processes are well understood, organizational leaders should align analytics and mobile principles with the business needs. Design analytics-driven mobile technology to deliver insights in the moment to enable responsive decision-making in the field.

User requirements need to be central. Take steps to ensure the centrality of users to design by defining personas and journey maps that illustrate realistic "day-in-the-life-of" scenarios, and understanding customer end effects. Field teams need to verify the impact of mobile technology on day-to-day work. Customers need to validate likely impacts around their expectations.

**Step 2: Develop a mobility and analytics strategy**
A clear mobile governance model is necessary to maintain alignment and project communication. Start by assessing the business value of mobile technology and analytics to drive key business decisions. Identify which processes to optimize first, where to conduct pilot programs and whether to buy new mobility-oriented applications or build apps based on current business process understanding.

Develop a cohesive mobile strategy that clarifies what coordination is necessary to scale mobility across the enterprise. Define mobile enterprise architecture and assess mobile maturity. Develop a business case for mobile investments linked to ROI. Develop an actionable roadmap for mobile initiatives, with clearly defined milestones and cultural acceptance strategies.

Gauge the technical components of the mobility environment underlying mobile applications, including the mobility development platform, app security, device management processes, software integration, testing and quality assurance. Select devices along with operating systems (OSs), applications, security and analytics, and identify and implement application integration. Match device and OS to the criticality of the work, the level of native OS capabilities to be leveraged and the need to support BYOD contractors and customers.

**Step 3: Determine the best mobility option**

Deciding to build or acquire mobile apps is a key business decision, as many legacy software solutions are not structured for use in mobile apps. Building mobile requires multiple back-end integrations. Apps need to include viable offline modes when connectivity is not possible. Screen interfaces should focus on usability and context based on the specific activities of end users.

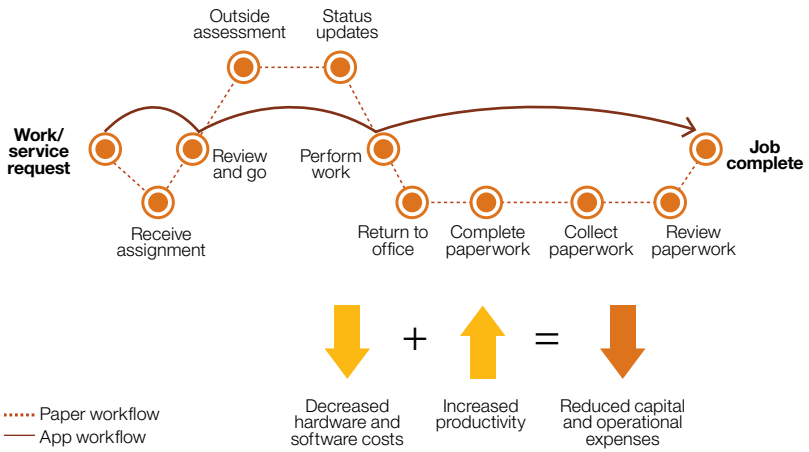
Mobile-based solutions are often substantially different from legacy solutions. Unlike legacy updates, which are typically performed annually, mobile solutions tend to have fast, agile development cycles, supporting multiple device form factors, contextual-awareness and strong security. Mobile solutions are typically cloud-based and focus on enabling broad functionality, rather than simply porting old screens to mobile devices.

**Step 4: Segment the audience**

Mobile and analytics compress traditional utility processes (see Figure 4). For example, legacy work-management solutions contain steps, including multiple reviews, jobsite inspections and field reporting, that can be readily reduced or eliminated with mobile – often while adding safety and collaboration capabilities.

**Figure 4**

*Productivity improvements from mobile and analytics*




*Source: IBM Institute for Business Value analysis*

When optimizing mobile technology solutions, the requirements of individual work activities will likely be varied, so it is important to adapt application of mobile and analytics technologies to specific circumstances. Automate or address legacy process steps wherever possible with analytics. New development tools can monitor usage data such as time spent on each activity or top activities by device class or user base. Use this information to help improve the user experience and promote expanded adoption.

**Step 5: Implement the mobile transformation**

When implementing a technological solution, it is critical to keep use cases and user experience at the forefront during the entire process while thoroughly addressing factors that may have a negative influence on final outcomes. Workers are more likely to adopt an effectively designed app that addresses their needs.

Not all applications warrant mobility enablement. Base decisions on projected business value, including mitigating factors, such as the potential write-off of existing software and device replacement cycles, which can delay benefit realization.

Succeeding with enterprise mobility is as much a people challenge as a technology challenge. A newly mobile-enabled workforce will have a wide range of reactions. For example, positive uptake can quickly turn negative if apps are deployed improperly or don't simplify tasks.

The move to mobile solutions requires employees to embrace the technology-enabled transformation and play a major role in driving deployment and realizing business benefits. Engage employees in overcoming implementation challenges and support them during the transition. Consistent communication on the status of the kickoff, along with clearly defined expectations of continued improvement and ongoing upgrades, will set expectations clearly so employees do not associate one release as the final product. Provide robust support, including training of new hires and legacy employees that might lack skills and experience in new mobile technology tools.

## Are you ready to lead a mobile transformation?

- How well do you and other stakeholders understand the mobile business case, including benefits, costs and risks, for your organization?
- What is your mobile strategy and its associated mobile architecture?
- Have you identified and prioritized the business units and employee groups for mobile transformation?
- Is there field data you're not leveraging that, if converted to knowledge, would help you meet key objectives and business requirements?
- Which business processes will you address to eliminate steps and improve worker safety?

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**Notes and sources**


1 International Energy Agency. "World Energy Outlook 2015 Factsheet: Global energy trends to 2040." https://www.iea.org/media/news/2015/press/151110_WEO_Factsheet_GlobalEnergyTrends.pdf

2 Martinot, E. "How is Germany integrating and balancing renewable energy today?" *Energy Transition.* February 19, 2015. Reproduced at the author's website at http://www.martinot.info/renewables2050/how-is-germany-integrating-and-balancing-renewable-energy-today

3 Bureau of Labor Statistics. United States Department of Labor. "Injuries, Illnesses, and Fatalities: Census of Fatal Occupational Injuries (CFOI) – Current and Revised Data." September 17, 2015. http://www.bls.gov/iif/oshcfoi1.htm

4 Ikeda, K., Marshall, A., and Majumbar, A. "More than magic: How the most successful organizations innovate." IBM Institute for Business Value. October 2015. http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=GBE03625USEN&appname=skmwww

5 Greentech Mediaeditors. "Grid Edge 20: The Top Companies Disrupting the US Electric Market." Greentech Media. April 23, 2015. http://www.greentechmedia.com/articles/read/Grid-Edge-20-The-Top-Companies-Disrupting-The-U.S.-Electric-Market, http://us.spindices.com/indices/equity/sp-500-utilities-sector

6 IBM Institute for Business Value. "Moving from the back office to the front lines – CIO insights from the Global C-suite Study." 2013. http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=PM&subtype=XB&htmlfid=GBE03580USEN

7 Ibid. "Stepping up to the challenge: CMO insights from the Global C-suite Study." March 2014. http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=XB&infotype=PM&appname=GBSE_GB_TI_USEN&htmlfid=GBE03593USEN&attachment=GBE03593USEN.PDF

8 Leeds, David J. "The Soft Grid 2013-2020: Big Data & Utility Analytics for Smart Grid." Greentech Media. December 2012. https://www.greentechmedia.com/research/report/the-soft-grid-2013

9 Ross, O. "CenterPoint Energy continues investing in innovative, customer-focused technologies." PR Newswire. February 12, 2015. http://www.prnewswire.com/news-releases/centerpoint-energy-continues-investing-in-innovative-customer-focused-technologies-300034914.html

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